by Kirk Kleinschmidt, NTØZ

PSK31—A Digital Mode That's Lots of Fun!

We've come a long way from the clunky teletype machines of yore. And I should know. As a Kleinschmidt, a distant relative of mine gave us the Kleinschmidt Perforator, a mechanical teleprinter about the size of a compact car—and just as loud! Old-timers still give me hell about that thing! Luckily, thanks to the personal computer boom that is now starting to span *generations* of hams, enjoying the digital modes is easier than ever.

Not too many years ago we might have started monitoring shortwave RTTY and fax stations with a variety of equipment, ranging from cheap two-diode PC serial interfaces to expensive HAL or Universal terminal units. In the late 1980s, multimode terminal units from Kantronics and AEA were the rage, pushing aside the more venerable RTTY-only gear made by TONO and HAL. During this time, RTTY itself saw competition from the various error-correcting "handshaking" modes (AMTOR, packet, PACTOR, G-TOR, CLOVER, and so on), and I couldn't help feeling that an era was coming to an end. RTTY was still around, but it wasn't exactly the "in" thing unless you were a ham radio digital-mode contester.

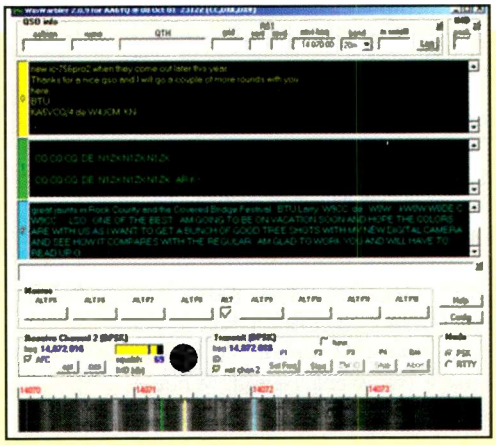
The error-correcting modes were fun for a while, but I found that working other stations via AMTOR, which keeps chirping away until all data is correctly transmitted and acknowledged, was too much like using the Internet. It didn't feel like *radio*, where our ability to copy ebbs and flows according to the whims of propagation.

What we needed was a new digital mode that *might* incorporate some means of error correction without requiring back-and-forth chirp-chirping to ensure copy. Well, friends, that mode is called PSK31. It's here, fully entrenched, and it isn't going away anytime soon. The neat thing is that you probably have everything you need to operate this exciting new mode right in your shack!

Introduced in the late 1990s, PSK31 zoomed to the digital forefront and is now a major player on the world stage. It's the digital mode of choice for an ever-increasing number of hams who've never worked the keyboard modes before. If you've always wanted to get started in RTTY but lacked the hardware, or the fortitude, to mess with it all, PSK31 is for you!

PSK31

Peter Martinez, G3PLX, the whiz-kid who came up with AMTOR, also developed PSK31, the mode that's well on its way to making conventional RTTY a thing of the past. PSK31 uses the DSP brains of your IBM-compatible computer's sound card (16-bit) and free (open source, like *Linux*) software that runs in Windows 95/98/NT/2000/XP. If your present sound card is an old 8-bit model, don't worry, a new 16-bit card can cost as little as $9 at a computer parts store or flea market. The hardware required to connect your PC's sound card to your radio, and to make an optional PTT connection between your PC and your rig, can be built from junk-box remnants or purchased from any RadioShack store for less than $10. That's as close to free as you can get nowadays!



Although there are literally dozens of decent PSK software packages available nowadays—and most are free for the downloading—my favorite is still WinWarbler, by Dave Bernstein, AA6YQ. As part of the excellent DXLab suite of cutting-edge ham radio programs, WinWarbler can send and receive PSK31, PSK63, and RTTY. In PSK mode it can decode several separate conversations simultaneously and features three live chat windows for the multitaskers in the crowd! Check it out at www.qsl.net/dxlab.

And if you want an affordable ready-made interface, check out the Rigblaster series at West Mountain Radio (www.westmountainradio.com). It's the Cadillac of PC sound card interfaces and a real pleasure to use. It's also relatively easy on the pocketbook. MFJ and several other manufacturers also make sound card interfaces. They're practically everywhere.

The "PSK" in PSK31 stands for Phase Shift Keying, the space-age modulation technique used to transmit an entirely new digital code. The "31" refers to the data rate, or baud rate, of the transmitted signal. It also represents the bandwidth occupied by a PSK31 signal—a paltry 31 Hz! A newer variant, PSK63, can sling characters at 100 wpm and takes up twice as

Where To Find Those PSK Signals

PSK31's distinctive droning signals can be found in most parts of the digital subbands, especially near 14,070 kHz. In PSK's early days, 20 meters was the only hot spot. Now, however, when the band is open, PSK activity spreads out, centering mostly around the following frequencies. Remember, with such a narrow signal bandwidth, a lot of PSK31 transmissions can share a crowded band. Some ops report that 100-Hz channel separation is sufficient for interference-free copy! Look for PSK31 signals here (in MHz):

1.838.150	10.142.150	21.080.150
3.580.150	14.070.150	24.920.150
7.080.150	18.100.150	28.080.150

much bandwidth as PSK31 (hence the name PSK63). PSK63 offers faster contest exchanges and improved performance on radio paths that travel over the poles. For all practical purposes, the two modes use the same hardware, software, etc.

The digital code itself is called *Varicode*, a term coined by G3PLX because each character is made up of a varying number of data bits, just like Morse code! And just like Morse code, commonly used letters have fewer bits, while rarely used characters have a whole bunch.

So what does this mean in practical terms? PSK31 takes up almost no precious bandwidth, its weak-signal performance is comparable to that of Morse code (a definite improvement over RTTY), and it will likely cost you less than a night at the bowling lanes to get started. And QRP ops take notice: PSK31 is so efficient that it works famously while running low power. Neat! (Actually, there are other nifty PSK31 features, but I don't have the space to explore them here!)

Getting Started

Steve Ford's excellent introductory article in the May 1999 issue of *QST* ("PSK31...Has RTTY's Replacement Arrived?" on page 41) is still an excellent way to get started. If you don't have access to a copy of the issue, point your web browser to www.qsl.net/wm2u/psk31.html. You'll find free-to-download PSK31 software, detailed info about PSK31, build-them-yourself hardware interface schematics, and excellent links to related sites.

Assuming you have a 486-or-better PC running Windows 95, 98, NT, 2000, or XP, you'll need a 16-bit sound card, the downloadable software, a fairly stable HF SSB rig (USB is the ad hoc standard for PSK31) and a set of cables to interconnect the components. Like I said, you probably have all this stuff in your shack.

Hot Spots

Once you have your software and hardware up and running, tune around the digital subbands (especially on 20 meters) and look for PSK31 signals. They're distinctive, so you won't have much trouble finding them. PSK31 signals don't *deedle-eedle* like RTTY, and they don't *chirp* like AMTOR, they *warble* like a science fiction mind-control machine, or like a synthesizer played underwater. Once you've heard a PSK31 signal, you won't mistake it in the future.

"The "PSK" in PSK31 stands for Phase Shift Keying, the space-age modulation technique used to transmit an entirely new digital code."

Because the signals are so narrow, it's best to forget about "tuning them in" with your radio's tuning knob. Instead, tune your radio to one of the designated PSK hotspots (see "Where To Find Those PSK Signals") and take a look at your software's "waterfall" display. Simply click your mouse on one of the displayed signals and your software starts decoding it! From then on you can simply use the software's "automatic frequency control" to track your QSO partner if he or she drifts up and down in frequency. Once the desired signal is locked and you're seeing text flow across your screen, PSK31 QSOs proceed pretty much like regular RTTY.

Thousands of PSK31 ops are singing its praises. They're also mentioning that the mode can be a bit eerie at times. For example, thanks to PSK31's extreme sensitivity and exceptionally narrow bandwidth, signals that fade to the point of being inaudible often produce perfect copy!

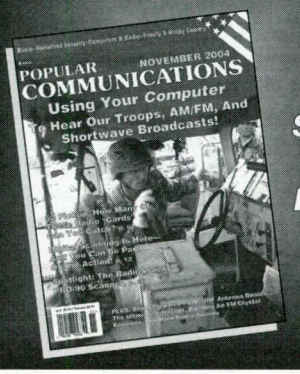
Time To Retire RTTY?

Will PSK31 replace RTTY over time? It just might happen. In fact, it's already happening! PSK31 offers all the benefits of Baudot RTTY and adds the weak-signal performance of CW. The gear is inexpensive, widely available and works better than the most expensive dedicated RTTY terminals made only a few short years ago.

The first PSK31 contest took place in April of 1999, and the new mode is now showing up in DXpeditions, Field Days, and Special Events. Check it out!

As always, send your QSL cards, questions and letters to Ham Discoveries, 25 Newbridge Rd, Hicksville, NY 11801. See you in the waterfall! ■

To Order Back Issues



Only $4.00 Per Issue

When ordering back issues include the following information: Name, address, city, state & zip. Please make a list of the issues you're requesting. When paying by credit card send the number along with the expiration date. Check, Money Order, Mastercard, VISA, Discover and AMEX accepted.

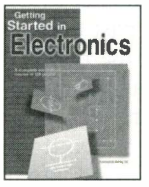
Complete your collection today.

For Faster Service
Fax 1-516-681-2926
Popular Communications
25 Newbridge Road
Hicksville, NY 11801
Phone: 1-516-681-2922

Earn Your
HAM RADIO LICENSE
The Quick and Easy Way!
No Morse Code Required!!

GWTM
$15.95
+ $6 S&H

Start earning your Technician ham license today! Get on the air and enjoy the fun hobby of amateur radio. Learn from the "Master" – Gordon West, WB6NOA. Study manual includes all possible test Q&A and more – or study at your PC using interactive practice exam software – **NCS $39.95 + $6 S&H.**



GSTD
$17.95
+ $6 S&H

Getting Started in Electronics is a complete electronics course in 128 pages! Forrest Mims teaches you the basics, takes you on a tour of analog and digital components, explains how they work, and shows how they are combined for various applications. 100 electronic circuits you can build and test!

The W5YI Group
POB 565101 – Dallas, TX 75356
Order today on the web or call:
www.w5yi.org ♦ 800.669.9594
Want to know more about ham radio? Call us!
Mention this ad to receive a free gift with your order!